

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

10/089979

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Applicant's or agent's file reference	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/RU00/00238	International filing date (day/month/year) 20 June 2000 (20.06.00)	Priority date (day/month/year) 05 August 1999 (05.08.99)
International Patent Classification (IPC) or national classification and IPC F02M 31/16, 37/22, B04B 1/08		
Applicant OBSHESTVO S OGRANICHENNOI OTVETSTVENNOSTIJU FIRMA "DITO"		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.  <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  These annexes consist of a total of _____ sheets.
3. This report contains indications relating to the following items:  I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 09 February 2001 (09.02.01)	Date of completion of this report 01 October 2001 (01.10.2001)
Name and mailing address of the IPEA/RU  Facsimile No.	Authorized officer  Telephone No.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/RU00/00238

## I. Basis of the report

### 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed
- ☐ the description:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the claims:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, as amended (together with any statement under Article 19  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the drawings:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

### 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

### 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

### 4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

### 5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.  
PCT/RU 00/00238

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	1-5	YES
	Claims		NO
Inventive step (IS)	Claims	1-5	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-5	YES
	Claims		NO

## 2. Citations and explanations

The following information sources were taken into consideration when establishing the present report:

D1 - RU 2054572 C1

D2 - RU 2105184 C1

D3 - SU 1813912 A1

D4 - DE 3442980 A1

D5 - US 5052996 A

D1 discloses a method for the complex processing of diesel fuel that involves heating the diesel fuel, homogenising and separating the same in a field of centrifugal forces in a rotor-disc eddy apparatus, and carrying out a fine filtration through a filtration porous medium made of a hydrophobic material. D1 also discloses an eddy apparatus of the rotor-disc type for the complex processing of diesel fuel. This apparatus includes a body with inlet and outlet pipes, while a rotor with a set of conical plates provided with openings on the perimeter of their peripheral area is provided in the inner cavity of said body, wherein said inner cavity communicates with the environment.

D2 discloses a method for the complex processing of diesel fuel that involves heating the diesel fuel, homogenising and separating the same in a field of centrifugal forces in a rotor-disc eddy apparatus, and carrying out a fine

filtration through a filtration porous medium made of a hydrophobic material.

D3 discloses a method for the complex processing of diesel fuel that involves heating the diesel fuel and filtering the same.

D4 discloses a method for the complex processing of diesel fuel that involves filtering the same.

D5 discloses an eddy apparatus of the rotor-disc type for the complex processing of diesel fuel, that comprises a body with inlet and outlet pipes, while a rotor with a set of conical plates provided with openings on the perimeter of their peripheral area is provided in the body inner cavity that communicates with the environment.

According to Claim 1, the method of the present invention for the complex processing of diesel fuel differs from the known ones in that the diesel fuel is heated as it circulates in a closed-loop circuit comprising a heat exchanger and a rotor-disc apparatus of the open type. The method of the present invention also differs in that additional filtration is carried out using a multi-layered filter consisting of a reactor that comprises granules of a polyfunctional catalyst for alkylating aromatic compounds, as well as a charge layer consisting of a powder of transition materials or oxides thereof. The eddy apparatus of the rotor-disc type described in Claim 5 of the present invention differs from the known ones in that the conical plates have a destructive edge in the form of a flange with slits and bends and having the following geometrical parameters:  $D=(2.0-2.5)d$ ,  $H=(0.75-0.85)d$ ,  $\alpha=45^{\circ}-55^{\circ}$  where  $D$  is the diameter of the larger (lower) base of the conical plate;  $H$  is the height of the conical plate;  $d$  is the diameter of the smaller (upper) base of the conical plate; and  $\alpha$  is the angle between the generatrix and the larger (lower) base of the conical

plate.

The polyfunctional catalysis process carried out during the additional filtration of the diesel fuel to be processed results in the alkylation of aromatic hydrocarbons with unsaturated compounds, which together with the subsequent dehydrogenation increases the diesel fuel homogenisation level in terms of molecular weight and hydrocarbon structure. Furthermore, the preliminary mechanical destruction in the rotor-disc eddy apparatus together with the simultaneous separation and subsequent fine filtration makes it possible to remove the resinous-asphaltic compounds from the diesel fuel being processed, thereby enhancing the fuel quality and protecting the environment since the complete combustion of the fuel is enhanced.